biological science on account of the lack of experimental methods of investigation, and he has consequently undertaken to indicate certain classes of problems which are demanding experimental solution. Certain species, for example, occupy habitats so diverse that there seems legitimate ground for doubting whether the different forms are specifically identical. Amphibious species of *Polygonum* furnish striking examples of form variation and specific relations only to be determined by extensive experimental cultures. Here he recommends that "accommodations" be limited to transformations of individuals in response to changed environment, and "adaptation" to those of species, the former not being hereditary, but the latter being transmitted to offspring. The author also urges the investigation by experimental methods of all examples of apparent multiplicity of origin of species, and of natural hybrids and mutations.—GEO. D. FULLER.

Vascular anatomy of the Cycadophytes.—Miss BANCROFT[18] has traversed the evidence of the relationship between the vascular anatomy of the Cycadofilicales and the Cycadales. The particular vascular type of Cycadofilicales from which the cycad line has developed is the problem to which at least three answers have been given. SCOTT favors origin from the *Lyginodendron* type; WORSDELL from the *Medullosa* type; and Miss DE FRAINE from a situation represented by *Sutcliffia*, which rather mediates between the two preceding views. Miss BANCROFT has done good service in bringing the whole evidence of this critical situation together, and has reached the conclusion that the *Lyginodendron* and *Medullosa* types have arisen from a common stock, and that from this stock the cycad line has arisen, touching very close to the simpler forms of the *Medullosa* group. When competent opinion differs as to the particular origin of a given group, it will generally be found that the dispute can be arbitrated by referring all of the groups to a common origin.—J. M. C.

Leaf and root.—Many find difficulty in identifying a stem in some vascular plants. CHAUVEAUD[19] diagrams the first leaf and root of *Ceratopteris thalictroides* and calls the combination a *phyllorhiza;* the second leaf with its root constitutes the second *phyllorhiza*, etc. The fused portions are commonly called the stem. *Cordyline anstralis* presents a similar condition. In dicotyls, the first two phyllorhizas are not separated in time or space; they have a fused portion, the stem, and a common root. Why it should make any difference as to whether the fusion exists from the start, or occurs a little later, is not entirely clear. However, it must be admitted that even in some plants with two cotyledons, like the cycads, the two categories, leaf and root, seem sufficient for the

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[18] BANCROFT, NELLIE, Pteridosperm anatomy and its relation to that of the cycads. New Phytologist **13**:1 and **2**:41–68. *figs. 20.* 1914.

[19] CHAUVEAUD, GUSTAVE, La constitution et l'évolution morphologique du corps chez les plantes vasculaires. Compt. Rend. **158**:343–346. *figs. 8.* 1914.

seedling, and that the stem category is rather artificial.—CHARLES J. CHAMBERLAIN.

An arctic-alpine plant association.—Upon the "snow-flush," a substratum deposited on gentle slopes or flats by streamlets of snow water and composed of fine snow-dust material, there develops a characteristic association or succession of associations, recently described by SMITH.[20] He indicates its occurrence on Ben Lawers and cites the work of others, notably that of SCHRÖTER, RÜBEL, and BROCKMANN-JEROSCH, concerning its development upon the Alps. Pioneer algae are succeeded by a thick mat of the liverwort *Anthelia juratzkana*, which gives character and name to the association. *Polytrichum* sp. follows and is succeeded by *Salix herbacea*, *Alchemilla*, *Gnaphalium*, and other alpine plants, the floristic composition of the later stages varying in different localities.—GEO. D. FULLER.

Plant geography of the heights of Hautie.—ALLORGE[21] has made a floristic study of a plateau 15 by 10 kilometers in area, situated northwest of Paris at the confluence of the rivers Seine and Oise. The elevation of the plateau is about 190 meters, and it exhibits a considerable diversity of soil, with comparatively natural vegetation. The associations have been segregated according to the chemical nature of the soil, and that of the calcifuges is found to be most conspicuous and to cover almost the entire top of the plateau. The regional affinities of the flora are examined and shown to be chiefly western, although the area also seems to be a rather notable meeting ground of certain northern and southern forms.—GEO. D. FULLER.

Nitrite assimilation.—KOSSOWICZ[22] has found that molds (*Aspergillus niger*, *Penicillium glaucum*, *Mucor Bodin*, and others) can readily assimilate nitrite when it is the only source of nitrogen. It is important that by the most delicate test (NESSLER'S method), HN_3 could not be detected in the cultures except in two instances, and in these only after long cultural periods (26 days). The nitrite-ion can evidently then be directly assimilated without the intermediate production of NH_3.—E. M. HARVEY.

A cytological life cycle.—In a series of diagrams based upon the life history of the fern, GRIGGS[23] presents current notions as to the behavior of chromosomes in the sporophyte and gametophyte, and also during fertilization and reduction. While the illustration should not be pressed too far, the diagram will be useful for didactic purposes.—CHARLES J. CHAMBERLAIN.

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[20] SMITH, W. G., Anthelia: an arctic-alpine plant association. Scot. Bot. Rev. **1**:81–89. 1912.

[21] ALLORGE, A.-PIERRE, Essai de géographie botanique des hauteurs de l'Hautie et de leurs dépendence. Rev. Gén. Botanique **25**:417–431, 472–493. 1913.

[22] KOSSOWICZ, ALEX., Nitritassimilation durch Schimmelpilze. Zeitschr. Gärungsphysiol. **3**:321–326. 1914.

[23] GRIGGS, R. F., A cytological life cycle. Ohio Naturalist **13**:142–145. *pl. 6.* 1913.